Lesson/Learning Sequence	Intended Knowledge: *Students will know that…*	Prior Knowledge: *In order to know this, students need to already know that…*	Working Scientifically	Tiered Vocabulary and Reading Activity	Support
Lesson: Metals and Acids	• *Students will know that when acids and metals react together the products are salt and hydrogen* • *Students will know that the reactions between metals and acids can be represented with symbol and ionic equations* • *Students will know how to describe the reactions as redox reactions* • *Students will know how to determine which species has been oxidised (lost electrons) or reduced (gained electrons)* • *Students will know how to represent the reactions of magnesium, zinc and iron with hydrochloric and sulfuric acid using symbol and ionic equations*	• *Students need to already know how to name salts* • *Students need to already know how to balance symbol equations*	Experimental Skills and Strategies	*Redox reactions – when oxidation and reduction occur simultaneously*	Tassomai Knowledge organiser BBC bitesize KayScience videos
Lesson: Soluble Salts (Required Practical)	• *Students will know that soluble salts can be produced from acids by reacting them with solid insoluble substances, such as metals, metal oxides, hydroxide or carbonates.* • *Students will know that the solid is added to the acid until no more reacts, and that the excess solid is filtered off to produce a solution of the salt* • *Students will know that salt solutions can be crystallised to produce solid salts* • *Students will know how to describe the method used to make pure, dry samples of names soluble salts from information provided*	*Students need to already know how to name salts produced*	Experimental Skills and Strategies	*Tier 3* *Solute: The solid dissolved in solution* *Solvent: The liquid that the solute is dissolved into* *Solution: When a solute dissolve in a solvent*	***Lesson: Soluble Salts (Required Practical)*** Tassomai Knowledge organiser BBC bitesize KayScience videos
Lesson: Soluble Salts (Required Practical)	• *Students will know that soluble salts can be produced from a metal carbonate or an alkali with a dilute acid.* • *Students will write the equations for the reactions of a metal carbonate + acid → salt + water + carbon dioxide* • *Students will know how to test for the presence of carbon dioxide using limewater. If carbon dioxide is present, the limewater will turn from colourless to cloudy.*	*Students need to already know how to name salts produced, students already know how to use experimental equipment*	Experimental Skills and Strategies	*Systematic error - one that affects all measurements of the same variable in the same way*	Tassomai Knowledge organiser BBC bitesize KayScience videos
Lesson: Acids and alkalis	• *Students will know that acids produce H+ ions in aqueous solutions* • *Students will know that aqueous solutions of alkalis contain hydroxide ions (OH-)* • *Students will know that the pH scale goes from 0 to 14, and is a measure of the acidity or alkalinity of a solution*	***Students need to already know that universal indicator works by changing colour in acidic/ alkaline conditions***	Experimental Skills and Strategies	*Tier 3* *Alkalis: substances which have a pH above 7 and contain hydroxide ions (OH-)* *Acids: substances which have a pH*	Tassomai Knowledge organiser BBC bitesize KayScience videos

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	• *Students will know that the pH of a solution can be determined through using universal indicator or a pH probe* • *Students will know that a solution with a pH of 7 is neutral* • *Students will know that acids have a pH less than 7* • *Students will know that alkalis have a pH above 7* • *Students will know the following 3 common acids, along with their formula:* • *Hydrochloric acid - HCl* • *Sulfuric acid - H2SO4* *Nitric acid - HNO3*			*below 7 and contain hydrogen ions (H+)* *pH scale: A measure of how many hydrogen ions there are in a solution.*	
Lesson: Strong and Weak Acids (Higher tier)	• *Students will know that acids ionise (split into their ions) in aqueous solution* • *Students will know that strong acids completely ionise in aqueous solution* • *Students will know that hydrochloric acid, nitric acid and sulfuric acid are examples of strong acids* • *Students will know that weak acids only partially ionise in aqueous solution* • *Students will know that examples of weak acids include ethanoic acid, citric acid and carbonic acids* • *Students will know that for a given concentration of aqueous solutions, the stronger an acid, the lower the pH* • *Students will know that as the pH decreases by one unit, the hydrogen ion concentration of the solution increases by a factor of 10* • *Students will know how to use the terms dilute, concentrated, weak and strong correctly* *Students will know how to describe neutrality and relative acidity in terms of the effect on hydrogen ion concentration and the numerical value of pH*	***Students need to already know that the acidity of a substance is linked to the amount of H+ ions***	Experimental Skills and Strategies	*Strong acids – fully ionise in solution* *Weak acids – partially ionise in solution*	Tassomai Knowledge organiser BBC bitesize KayScience videos
Lesson: Neutralisation	• *Students will know that neutralisation reactions are reactions where an acid is neutralised, producing salt and water only* • *Students will know that in neutralisation reactions between an acid and an alkali, hydrogen ions react with hydroxide ions to produce water*	***Students need to already know the colours associated with universal indicators***	*Neutralisation – when an acid reacts with an alkali/base to produce salt and water only.* *Neutral – a substance with a pH of 7*	*Tier 2* *Tier 3* *Neutralisation: the reaction of an acid with an alkali/ basic substance that*	Tassomai Knowledge organiser BBC bitesize KayScience videos

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	• *Students will know that acids can be neutralised by metal oxides or metal hydroxides* • *Students will know that the ionic equation for neutralisation is:* • *H+ + OH- --> H2O* • *Students will know how to describe the use of indicator to measure the approximate pH of a solution* • *Students will know how to use the pH scale to identify acidic or alkaline solutions* • *Students will know that the name of salt produced in neutralisation depends on the acid and alkali used.* • *Students will know that the suffix of the salt depends on the acid as follows:* *hydrochloric acid - chloride* *sulfuric acid - sulphate* *nitric acid - nitrate* *Students will know how to write equations to represent neutralisation*			*produces water and salt only*	
Lesson: Titration REQUIRED PRACTICLAL (TRIPLE ONLY)	• *Students will know that the volumes of acid and alkali solutions that react with each other can be measured by titration using a suitable indicator* • *Students will know how to carry out titrations using strong acids and strong alkalis* • *Students will know how to calculate the chemical quantities in titrations involving concentrations in mol/dm3 and g/dm3*	***Students need to already know how to calculate concentration in mol/dm3 and g/dm3***	*Apply a knowledge of a range of techniques, instruments, apparatus and materials to selector those appropriate to the experiment.* *Plan experiments to produce or characterise the substance*	*Titration – an analysis technique used to determine the concentration of an unknown solution.* *Concordant – results within 0.1 of each other*	Tassomai Knowledge organiser BBC bitesize KayScience videos
Lesson: Concentration of Solutions	• *Students will know that most chemical reactions take place in solutions* • *Students will know that the concentration of a solution can be measured in mass per given volume e.g. g/dm3* • *Students will know the equation for calculating concentration is:* • *concentration = mass ÷ volume* • *Students will know that to convert from cm3 to dm3 you need to divide by 1000* • *Students will know how to calculate concentration from mass of a solute* • *Students will know how to explain how mass of a solute and volume of a solution are related to the concentration of the solution*	***Students need to already know that grams is a unit of mass***	*Presenting observations and other data using appropriate methods.* *Interpreting observations and other data*	*Tier 2* *Convert: change the form, character, or function of something.* *Tier 3* *Concentration: The amount of a substance in a certain volume of a solution.*	Tassomai Knowledge organiser BBC bitesize KayScience videos

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				Solution: When a solute dissolve in a solvent	
Lesson: Production and uses of NPK Fertilisers (TRIPLE ONLY)	• *Students will know that fertilisers used to improve agricultural productivity often contain compounds of nitrogen, phosphorus and potassium* • *Students will know that NPK fertilisers contain compounds that contain all three of nitrogen, phosphorus and potassium* • *Students will know that NPK fertilisers are formulations* • *Students will know that ammonia can be used to manufacture ammonium salts and nitric acid, which are compounds that contain nitrogen* • *Students will know that potassium chloride, potassium sulfate and phosphate rock are obtained by mining* • *Students will know that phosphate rock can't be used directly as a fertiliser, so needs to be treated with nitric acid or sulfuric acid to produce soluble salts.* • *Students will know how to compare the production of fertilisers in industry and in laboratories.*	• ***Students need to already know how to name salts*** • ***Students need to already know that a formulation is a mixture of substances that have been carefully mixed to have certain properties.***	*Understand how scientific methods and theories develop over time.* *Use prefixes and powers of ten for orders of magnitude*	*Tier 2* *Fertiliser: a chemical or natural substance added to soil or land to increase its fertility* *Agricultural productivity: the science or practice of farming, including cultivation of the soil for the growing of crops*	Tassomai Knowledge organiser BBC bitesize KayScience videos